



Lessons from America's first space station point to new challenges on the horizon. Story on Page 3.



About a hundred JSC employees became big wheels for a day for National Bike to Work Day. Story on Page 4.

Space News Roundup

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JSC Photo by Jack Jacob

STS-55 Mission Specialist Charlie Precourt is greeted by three happy girls, daughters Aimee, Sarah and Michelle, at Ellington Field, and Payload Specialist Hans Schlegel prepares for a welcome from his daughter, Lisa, at right.

Crew brings home message of peace, hope

The STS-55 Spacelab D-2 crew brought home a message of peace and hope for the future at Ellington Field last week as friends and family members welcomed them back from a 10-day flight aboard *Columbia*.

"I think we can take this mission as an example of successful and tolerant cooperation between different nations and I hope that in the future we will again find a way to more engaged international space station freedom and I hope that even more countries will be involved in future international missions," said Payload Specialist Hans Schlegel.

Calling the flight the highlight of his professional career as experimental physicist, Schlegel thanked first the families who had made it possible for the crew to work toward and on the mission, and next the training teams in Houston and in Germany who had prepared the crew for the flight.

"This mission was not only a German American mission, it was more," said Schlegel. "There were experiments from Italy, from Spain, from Sweden, from Denmark, from Japan, from all over the world. I believe that like all the people working together for mission operations in

these different countries were working this mission like a family. I believe space flight in the future will make all the people on Earth feel and think like one family."

Mission Specialist Charlie Precourt also touched on family, reminding those present that 20 stars in the mission patch represented the children of the astronauts.

"The challenge was there and we met it after some difficulties," Precourt said. "I think we did them proud with this mission."

"This was a real hum-dinger, it was great from beginning to end," Precourt said. Please see STS-55, Page 4

Early June launch

Endeavour crew ends rehearsal for June launch

By James Hartsfield

Endeavour remained on schedule this week as preparations, including a dress-rehearsal of the countdown, continued at Launch Pad 39B for an STS-57 launch perhaps as early as June 3.

The STS-57 crew—Commander Ron Grabe, Pilot Brian Duffy and Mission Specialists David Low, Nancy Sherlock, Jeff Wisoff and Janice Voss—traveled to Kennedy Space Center on Tuesday for safety training and the rehearsal count to be completed by Friday. Shuttle managers are scheduled to meet at KSC this Friday for a final review of preparations for STS-57, following which an official launch date will be announced.

Meanwhile, work at the pad focused on *Endeavour's* engine compartment, with a leak check of all main engine plumbing scheduled to be finished during the weekend. In addition, technicians last week finished fueling the spacecraft's orbital propulsion systems.

The major payload of the mission, Spacehab, will begin a new era in the commercial development of space as the first flight of a privately developed mid-deck augmentation module. The experiments inside Spacehab include investigations ranging from drug improvement, plant feeding, cell splitting, soldering and high-tem-

perature melting of metals.

Crew members also will retrieve the European Retrievable Carrier satellite and have the opportunity to use experiments designed by and for students. A four-hour space walk will continue a series of EVAs designed to expand the experience levels of astronauts, flight controllers and instructors in anticipation of erecting the space station.



Elsewhere, *Columbia*, atop the 747 Shuttle Carrier Aircraft, departed Edwards Air Force Base, Calif., for the trip back to Florida on Tuesday. *Columbia* stopped overnight at Biggs Army Airfield in El Paso and then continued Wednesday to Kelly Air Force

Base in San Antonio, where it remained overnight. *Columbia* was planned to arrive in Florida Thursday, weather permitting.

In the bay 3 processing hangar at KSC, *Discovery* is being readied for a mid-July launch on STS-51. Last week, structural inspections of the spacecraft were performed, the waste collection system was installed and checkouts were performed on the main engine controllers. Technicians also performed pre-installation tests of the orbital maneuvering system pods.

Atlantis remains at Rockwell's Palmdale, Calif., shuttle factory in the midst of a series of periodic shuttle upgrades and structural inspections.

Close call reminds drivers to watch out for runners

A recent close call on Avenue B has prompted JSC joggers and security officials to remind drivers to keep an eye out for fitness runners along the road to JSC's back gate.

Runner Brian Barnett was running the marked 5-kilometer course on Wednesday, heading west on the north side of Avenue B on the far right median, when he was nearly hit

"As I was running, a car traveling in the same direction I was running passed over the line and onto the median, passing within approximately one foot of me," Barnett said. "At first I thought that maybe it was some friend of mine kidding around. But then I realized that the person apparently was not paying attention and had drifted onto the median and

had almost run over me."

Bob Gaffney, chief of JSC's Security Operations Branch, said the incident has prompted a search for safer options that may be available for JSC joggers. He said he would review alternatives with safety officials and the rest of the Center Operations Directorate.

In the meantime, he urged all

motorists and pedestrians—runners or walkers—to pay attention to all traffic warnings on JSC streets and at JSC crosswalks. There also have been recent accidents involving pedestrians at crosswalks. Gaffney reminded pedestrians who park their cars and begin walking to their offices to keep their defensive driving awareness in operation even

after they have left their vehicles.

The Bay Area Running Club recommends that motorists be alert at any time of the day when driving on Avenue B or the Second Street. Runners appreciate any effort by drivers to move away from the shoulder when traffic allows, and when drivers let them know they are aware of the runner.

Designing the future

Reviewers needed to critique student projects in University Advanced Design competition

By Audrey Schwartz

Futuristic interplanetary spacecraft, robotic lunar rovers, Earth orbiting satellites and hypersonic airplanes will be among the concepts presented by 44 university student teams who will convene in Houston on June 14-18 for the annual University Advanced Design Summer Conference.

JSC, for the first time, will host the conference at the Sheraton Crown Hotel Conference Center-Intercontinental Airport.

Now in its ninth year, the Advanced Design Program, sponsored by NASA and managed by the Universities Space Research Association, was conceived to

revive interest in engineering design education and to give students experience with developing "real world" projects of interest to NASA and the aerospace industry. USRA is a 76-member university consortium created by the National Academy of Sciences helping universities and other researchers cooperate with government and industry to further space science and technology.

Reviewers from NASA and industry will critique the projects and presentations as well as provide technical guidance to the teams for improving their designs. Volunteers who possess technical degrees or experience are needed to serve as

Please see DESIGN, Page 4



JSC Photo by Benny Benavides

University of Texas-Austin aerospace engineering students discuss their advanced design concept with JSC technical professionals during a May 7 preliminary design review. The UT team designed a DSN Satellite to study Ka-band transmissions through the atmosphere. Seated, from left: Joe Kosmo, JSC Crew and Thermal Systems Division; Dean Glenn, Technology and Commercial Projects Office; Joe Araiza, Dennis McWilliams and Clint Slatton, UT design students. Standing, from left: UT design team members Cassidy Norman, a JSC co-op, and Mark Tedesco, a Rockwell co-op.

100 employees to receive JSC's highest honor

JSC Director Aaron Cohen will present the center's highest tokens of esteem to about 100 employees at Thursday's JSC Honor Awards Ceremony.

The JSC Certificate of Commendation, reserved for no more than 3 percent of the civil service work force each year, will be presented to employees who have made significant contributions to the mission and operation of JSC at 3 p.m. Thursday in the Gilruth Center ballroom.

Recipients are encouraged to invite family members and coworkers to the ceremony, which will be followed by a reception. Supervisors are encouraged to allow coworkers to attend as their work loads permit.

Please see JSC, Page 4

JSC

Ticket Window

The following discount tickets are available for purchase in the Bldg. 11 Exchange Gift Store from 10 a.m.-2 p.m. weekdays. For more information, call x35350 or x30990.

EAA Astros vs. Giants (7:05 p.m. June 19): \$9, on sale until May 28.

Splash Town USA — Discount tickets: \$10.50.

Astroworld Early Bird Special — Tickets purchased before May 31 and used before June 30 at \$15.95.

Sea World in San Antonio — Discount tickets: adult, \$19.75; child (3-11), \$13.15.

Fiesta Texas, San Antonio — Discount tickets: adult, \$18.35; child (4-11) \$12.75.

Space Center Houston — Discount tickets: adult, \$7.50; child (3-11) \$4.50; commemorative: \$8.75.

Metro tickets — Passes, books and single tickets available.

Movie discounts — General Cinema, \$4.50; AMC Theater, \$3.75; Loews Theater, \$4.

JSC

Gilruth Center News

Sign up policy — All classes and athletic activities are first come, first served. Sign up in person at the Gilruth Center and show a badge or EAA membership card. Classes tend to fill up four weeks in advance. For more information, call x30304.

EAA badges — Dependents and spouses may apply for photo identification badges from 6:30-9 p.m. Monday through Friday. Dependents must be between 16 and 23 years old.

Defensive driving — Course is offered from 8 a.m.-4:30 p.m. May 15 and June 12. Cost is \$19.

Weight Safety — Required course for employees wishing to use the Gilruth weight room is offered from 8-9:30 p.m. May 20. Pre-registration is required; cost is \$5.

Aerobics — High/low-impact classes meet from 5:15-6:15 p.m. Tuesdays and Thursdays. Cost is \$32 for eight weeks.

Exercise — Low-impact class meets from 5:15-6:15 p.m. Mondays and Wednesdays. Cost is \$24 for eight weeks.

Aikido — Martial arts class meets Tuesdays from 6:15-8 p.m. Cost is \$15 per month.

Scuba — Classes meet Tuesdays and Thursdays for four weeks beginning June 17. Cost is \$190, with a \$50 deposit required at registration.

Fitness program — Health Related Fitness Program includes medical examination screening, 12-week individually prescribed exercise program. Call Larry Weir, x30301.

Softball tournament — Men's Open "C" Tournament will be May 22-23. Cost is \$95 per team, double elimination. Register before 7 p.m. on May 20.

JSC

Swap Shop

Swap Shop ads are accepted from current and retired NASA civil service employees and on-site contractor employees. Each ad must be submitted on a separate full-sized, revised JSC Form 1452. Deadline is 5 p.m. every Friday, two weeks before the desired date of publication. Ads may be run only once. Send ads to Roundup Swap Shop, Code AP3, or deliver them to the deposit box outside Rm. 147 in Bldg. 2. No phone or fax ads accepted.

Property

Rent: Galv condo, furn, sleeps 6, Seawall & 61st St, cable, wknd/wkly/daily. Magdi Yassa, 333-4760 or 486-0788.

Sale: Dickinson Bayou waterfront, 4-2.5-2, pool, 100 yr old trees, WBFB, volleyball/ horseshoe setup, \$224K. x34354 or 337-1640.

Sale: MeadowBend, 3-2-2, upgraded carpet, Calif style deck/cover, track lights, custom wallpaper. Brent Romero, 334-1996.

Sale: Colorado, 2 BR, sleeps up to 5, located in Pagosa Springs, close to skiing, fishing, hiking, no smokers, no pets. Bob, x30825 or 998-7372.

Sale: LC, lot, 82' x 130', \$9.5k. x36514.

Lease: Barringer Way condo, 2-1, W/D conn, stor area, pool, no pets, ex cond, \$450/mo. 486-2048.

Lease/Sale: CLC/Baywind II condo, 2-2-2, redecorated, outside unit, 8 windows, W/D, sec, \$595 assumable. 280-8796 or 938-0921.

Sale: CL golf course, 3-2-2, new roof, air, heat, paint, \$79k. 488-4287.

Lease: Webster condo, 2-1, new paint/carpet, all appl, FPL, patio, W/D conn, storage, \$495/mo. 486-0315.

Rent: Arkansas cottage overlooking Blue Mountain lake, furn, wooded, 4 acres, screened, antiques, \$250/wk, \$50/day. x33005 or 538-4141.

Lease: Dear Park, 3-2-2 study, lg fenced yard, avail 7-1, \$900/mo. 930-1896.

Rent: Egret Bay condo, 2-2-2, W/D, FPL, 2 fans, new carpet, new paint, \$550 + dep, no pets. Manisha, 286-7219.

Sale: Meadowbend, 3-2-2, 1480 sq ft, FPL, sundeck, new carpet, fence, gar doors, \$69.9k. Nasser, x33685 or 334-1032.

Lease: West Univ, 2-1-1, furn, avail 8-1 for 1 yr, Wesleyan at College, non-smokers, no pets, \$900/mo + dep. 667-6180 or 244-8396.

Sale: Pearl and Sunset Meadows, 3-2.5-2, formals, study, huge master BR, upgrades, 2 story brick, 2 yrs old, \$110k. Jim, 482-8800.

Sale: LC, 3-2-1, split floorplan, separate master BR, lg living room, jacuzzi, lg deck, 10 yrs old, \$65k. Joe, 47017 or 480-8476.

Cars & Trucks

Mercedes 450SL, 2 tops, super convertible, \$9.5k. 488-8493.

'90 Lincoln TC, Signature Series, wht/gray, loaded, car phone, low miles, \$16.9k; '91 Jeep Renegade hardtop, AC, loaded, red/blk, ex cond, 12k mi, \$14.7K. Tom, x41119 or 534-4958.

'70 VW Bug, custom interior, clean body, ex cond, \$2k. Rick, 334-2036.

'82 Dodge Sapparo, 2 dr, 5 spd, lt gray, \$1k OBO. Stephanie, 437-6894.

'91 Trans Am GTA, 18k mi, PW/PL, leather, AM/FM/cass, \$13.5k. x48210.

'81 Monte Carlo, fair cond, \$1k OBO. x30961 or 409-945-5694.

'92 Honda Civic LX, blue, 4 dr, AC, PS/PB/PW/PL, cruise, air bag, tilt, tint, 32k mi, ex cond, \$11.5k. 282-6381.

'89 Hyundai Excel GLS, 5 spd, 4 dr, blk, sunroof, AM/FM/cass, AC, 49k mi, \$3.8K nego. Paul, x48518 or 480-9636.

'80 Mazda GLC, recent brakes, tires, fuel pump, 60k mi, \$1250. 488-4493.

'89 Toyota Tercel, teal, auto, tint, 42k mi, ex cond, \$4.6k OBO. 332-6456.

'85 Ford Club wagon van, V8 w/OD, auto, AC, ex cond, \$2950. John, 480-3542.

'87 Dodge Ramcharger, 82K mi. 487-1883.

'85 Toyota Cressida, leather int, new tires, \$4.5k. x48396 or 667-6180.

'85 Honda Accord LX, wht, 4 dr, blue int, AC, cruise, pwr, 5 spd, low miles, \$2.5k. Brad, x30453.

'83 Pontiac 6000 LE, ex body/int, runs good, needs AC, \$1.5k OBO. Mike, x31239 or 992-3522.

'85 Ford Santa Fe custom touring van, loaded, one owner, 72k mi, \$5.5k. Don, x38039 or 333-1751.

'71 Chevy Nova, V8, orig owner, \$4.5k. 480-1998.

'80 Volvo station wagon, diesel, leather int, new tires, \$2.7k. x48149.

'67 Mustang Coupe, green w/blk interior, 6 cyc, auto, good cond, needs carb work. Eddie, x38929 or 489-7778.

'90 Chevy Fleetside, metallic blue, 350 auto, short wheel base, Texas Stagecoach conv, Silverado pkg, 51k mi, \$10.5k. Lance, 997-0247 or 943-3842.

'78 Porsche 928, brown w/leather int, auto, ex cond, \$75k mi, \$8.5k. Bill, x48889.

Boats & Planes

22' Chrysler sailboat, 5 HSP Nissan O/B, great cabin, sleeps 6+, sanded,

Today

Cafeteria menu—Special: breaded cutlet. Entrees: beef chop suey, Polish sausage with potato salad. Soup: French onion. Vegetables: okra and tomatoes, green peas.

Tuesday

Cafeteria menu — Special: fried chicken. Entrees: Salisbury steak, shrimp Creole. Soup: split pea. Vegetables: mixed vegetables, beets, whipped potatoes.

Wednesday

Change forum — "NASA and the Individual" will be the subject of a no-holds-barred, free-for-all discussion about specific proposals for radical change at NASA from 11:30 a.m.-12:30 p.m. May 19 in the Bldg. 3 cafeteria. For more information about the series, call Mike Roberts at x36632.

AAS Spring Symposium — The American Astronautical Society's Southwest Section will present a spring symposium on "New Technologies and Current Events" from 8:30 a.m.-5 p.m. May 19 at the Gilruth Center. Keynote speaker will be JSC Director Aaron Cohen. Luncheon is \$8; reservations are due May 14, call Kathy Reeves at 488-5970.

Astronomy seminar — The JSC Astronomy Seminar will meet at noon May 19 in Bldg. 31, Rm. 129. Dr. Hans Blome of the German Aerospace Research Establishment, will speak about the "Cosmic Black Body Background and the Big Bang Model of the Universe." For more information, call Al Jackson at 333-7679.

Toastmasters meet — The Spaceland Toastmasters Club will meet at 7 a.m. May 19 at the House of Prayer Lutheran Church at the corner of Bay Area Blvd. and Reseda Drive. For more information, call Jim Morrison at 480-9793.

Cafeteria menu — Special: stuffed bell pepper. Entrees: fried catfish with hush puppies, braised beef rib, barbecue plate, wieners and beans, shrimp salad. Soup: seafood gumbo. Vegetables: corn O'Brian, rice, Italian green beans.

Thursday

Technical symposium — "Humans in Space: Maintaining the Momentum" will be the top at the American Institute of Aeronautics and Astronautics Houston Section's 18th annual Technical Symposium beginning at 8 a.m. May 20 at the University of Houston-Clear Lake. For more information, call Dick Bennett at x44532.

IEEE videoconference — The Institute for Electrical and Electronics Engineers will host a videoconference on "Delivering Software Products to the Global Marketplace" at 10:30 a.m. May 20 at the Gilruth Center. Registration deadline is May 13; call Frankie Hap at 333-6064.

Cafeteria menu — Special: barbecue smoked link. Entrees: beef stroganoff, turkey and dressing. Soup: chicken noodle. Vegetables: Lima beans, buttered squash, Spanish rice.

Friday

Cafeteria menu — Special: meat sauce and spaghetti. Entrees: baked scrod, liver and onions, fried shrimp.

Soup: seafood gumbo. Vegetables: green beans, buttered broccoli, whipped potatoes.

Monday

Cafeteria menu — Special: wieners with baked beans. Entrees: beef chop suey, breaded cutlet with cream gravy, grilled ham steak. Soup: beef and barley. Vegetables: buttered rice, Brussels sprouts, whipped potatoes.

May 26

Change forum — "NASA's Mission" will be the subject of a no-holds-barred, free-for-all discussion about specific proposals for radical change at NASA from 11:30 a.m.-12:30 p.m. May 26 in the Bldg. 3 cafeteria. For more information about the series, call Mike Roberts at x36632.

Astronomy seminar — The JSC Astronomy Seminar will meet at noon May 26 in Bldg. 31, Rm. 129. Al Jackson will discuss "Rockets and Explosions at Black Rock Desert, Nevada." For more information, call Al Jackson at 333-7679.

Freedom Fighters meet — The Space Station Freedom Fighters will meet at noon and 5 p.m. May 26 in Rm. 160 of the McDonnell Douglas Tower, Space Center Blvd. and Bay Area Blvd. For more information, call David Cochran at 482-7005.

June 2

Astronomy seminar — The JSC Astronomy Seminar will conduct an open discussion meeting at noon June 2 in Bldg. 31, Rm. 129. For more information, call Al Jackson at 333-7679.

ready for water, 3 sails, \$2k OBO. 409-245-5290.

16' canoe, Birch ribbed, teak side rails, canvas hull, wicker seats, air bladders for nontip bouyancy, removable rail decking, \$250 OBO. x36702 or 568-6705.

'90 Kawasaki 650 sx jet ski, dbl trlr, \$3.5k. Andy, x48523 or 334-4988.

Cycles

Yamaha RZ350, Kenny Roberts replica, prof eng porting, Mikuni carb, pipes, K&N jet kit, Dunlop radials, incl bike cover/helmet, \$1895 OBO. Hugo, 286-0432 or 335-2552.

'74 Kawasaki KS, 125cc, dirt bike, partially rebuilt, new chain, \$140. Keith, 482-2741.

Suzuki 1000's, Kawasaki, all reconditioned, ex cond. Jerry, 944-1337.

'85 Kawasaki KBX2000, pwr board, \$900 OBO. Frank, x39924 or 992-3515.

Audiovisual & Computers

TI-99-4A. Fred, 944-3523.

Computer desk, \$40. x31883.

IBM 286-16, mono, 1 MB RAM, 22ms 65 MB HD, 1.44, 1.2 MB FD, mouse, kybd, 2 para, 2 ser ports, coprocessor, 2400 int modem, \$525; smaller oak roll-top computer desk/chair, \$525, all for \$950. Pat, x32661 or 326-5342.

Pets & Livestock

Breeding, AKC reg, male, tiny toy poodle, apricot, stud fee, \$300. Rick, 334-2036.

Household

18 cu ft Amana regrid, wht, 5 yrs old. Fred, 944-3523.

5 pc sec w/rocker/recliner, green w/mauve/gray pinstripping, 1.5 yrs old, \$850; 2.6 cu ft GE refrig w/blk face, 1.5 yrs old, \$950. x41119 or 534-4958.

Oval dining tbl, solid wood, 70" x 45", 6 matching chairs, inc 2 big leafs, \$500; matching serving cabinet, \$200. 326-3137.

2 brwn chairs, \$65; tbl lamp, \$15; tortise shell hanging lamp, \$20, Pier 1 hanging lamp, \$15. Phil, x33640.

3 cushion couch, cream/red print, \$100; 2 wing back chairs, red, \$100/ea, all ex cond, \$275 for all 3 pcs. x36669 or 649-5488.

Glass dining tbl, 4 chairs, tbl 4' long, 3' wide, 1/2 inch thick, \$175. Brent, x36456.

Functional BR set, triple dresser, matching mirror, chest, nightstand, \$200. x38893.

Matching loveseat/sofa, good cond, \$200; 2 uphol chairs, ex cond, \$60/ea. 488-4493.

3 pc Bassett BR suite, dk solid/med brwn burled wood w/gold accents, Sealy ex-firm matt, box springs, 3 yrs old, \$550. 486-9605.

Blk loveseat/chair, 3 mos old, \$450. x39172.

Wanted

Want ladies RH golf clubs. x38624 or 475-9671.

Want used wood fence. x36514.

Want board members for JSC child care center, nominations due 5-3 for 6-1 elec, forms avail at CCC or contact Reese, x37776.

Want full/parttime infant caregivers and substitutes. Georgia, x34734.

Want carpoolers from Sycamore Valley near Ellington Field. Ed, x36250 or 481-4889.

Want 13"x5.5" or 6" wheel, also want used tire same sz. Tom, x36309 or 474-9747.

Want Mac II or equivalent, Mac only. 280-8796.

Want to buy '78-'82 Hondas for parts. 867-8820.

Want cheap work/school car w/AC. Phil, 488-4700.

Want nonsmoker, female, to share 2-2 in CL area, lg trees, private, \$362.50 + util, avail 6-1. 338-1088.

Want AC/refrigeration vacuum pump, working or not. Ronnie, x32539 or 538-1649.

Miscellaneous

Drop leaf antique tbl. x38624 or 475-9671.

GE side-by-side refrig/freezer, custom water/ice dispenser, lg 27 cu ft, almond textured finish, \$750. x48149.

Cal-gym 4 separate weight stations, 2 benches, prof quality, was \$3k, now \$1750. 488-8493.

4 hp self propelled rear bagger lawnmower, \$50. 482-3428.

Men's Riedell pro ice skates, blk, sz 7, blade cover, was \$125, now \$45; Mens SP204 rollerskates, blk, ex cond, sz 7, \$15; Men's ultra wheels rollerblades, blk, sz 8, good cond, \$10. 331-0611.

S&W Model 29, 44 mag revolver, ex cond, \$350. Mark, x35211 or 561-7768.

Wht, 15 cu ft, refrig, \$100; tbl, 4 chairs; 19" port color tv, welding machine, elec dryer, need work. x30626.

Eureka upright vacuum cleaner, 6.5 amp, \$90. Linda, x49658 or 486-6873.

Antique china cabinet, 66" x 36" x 16", \$350; oriental carpet, 9' x 12', red w/multi, \$200. 326-3137.

Off wht wedding gown, decorated w/pearl beads, sequins, lace back w/pearl buttons, chapel length train, sz

6-8, was \$900, now \$400. Laura, 335-2388 or 532-1557.

Love seat, chair, ottoman, \$75; loveseat, \$35; Sega Game Gear w/one game, \$75. Kyle, x48128.

Advanced Weider weight bench w/extra weights, dips, lats, quads, hams, bench press, \$125 OBO. 992-3876.

Wagner pwr roller plus, \$60; Bell microeye radar detector, \$30. Phil, x33640.

21" mower, 3.5 hp, 18" mower, 3 hp B-S, both good cond, \$80 & \$60; elec motor, 1/43, 1/3, 1/2, 1 HP; alum sliding door track for 1/4" thk wood or glass drs, 5 sets of tracks, each top/bottom, 6' long, was \$33, nw \$18/set, 3 jaw lathe chuck 6" dia, \$85; coolant pump on base w/1/4 hp motor, \$30. 921-7212.

Old school teachers desk; Truck cap, red, fits full sz Chevy PU, good cond, \$350. 996-1442.

Tour Model III golf clubs, 1-SW, \$16.95/club, metal woods, 1, 3 or 5 wood at \$35/club. David, 554-5514.

Alfred Angelo wedding gown w/slip, long veil, satin, beaded, scalloped train, sz 6-7, was \$900, now \$350. 339-3464.

Dining rm set, dbl pedestal tbl, 3 leaves, 6 chairs, pecan wood, was \$75, now \$25. 488-5974.

Elec oven/range, harvest gold, good cond, \$100; old refrig, \$35. 482-7783.

2 mo old 10" Delta radial arm saw, complete w/stand, owners manual, was \$548, now \$400. Jeff, 474-3265.

Camper pop up tent trlr, \$875. 996-9157.

Ladies 10 spd bike, Nishiki, small frame, good cond, \$25 OBO. Bob Adams, x32567 or 488-3314.

Wht wedding gown, decorated w/heavy pearl beading, bow connected to train, fits siz 6-8, well fitted, \$600. 481-6316.

Carpet, rust/cinnamon, 150 yds, good cond, \$375 for all or \$3/yd; ladies 10 spd bike, \$60. Mark, x38013 or 992-4132.

Traditional style country blue sofa, \$200; aluminum miniblinds, asst colors, sizes. Catherine, x37061 or 286-3560.

Solid wood desk, 7 drws w/lock, leather top, \$250. 486-1727.

Kg sz waterbed, semi motionless, blk leather hdbd, \$400. x36696 or 332-9102.

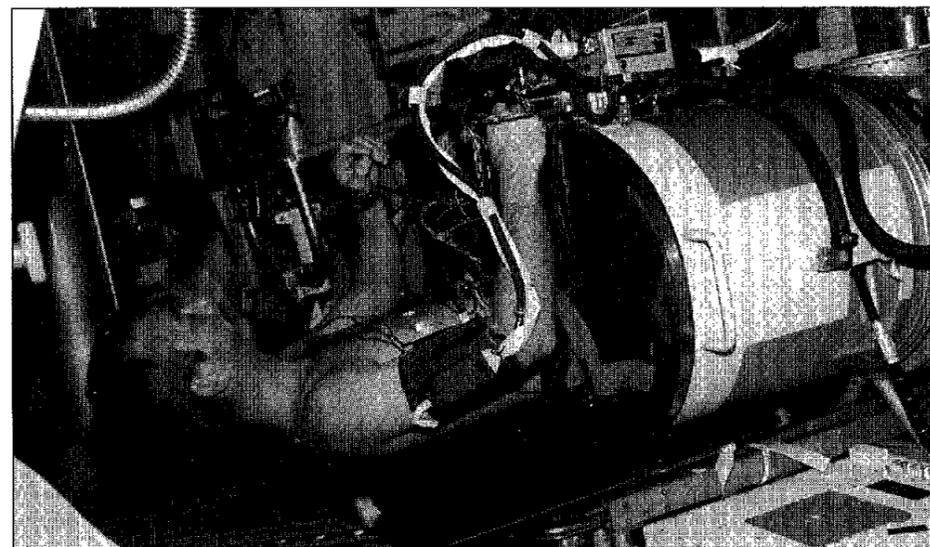
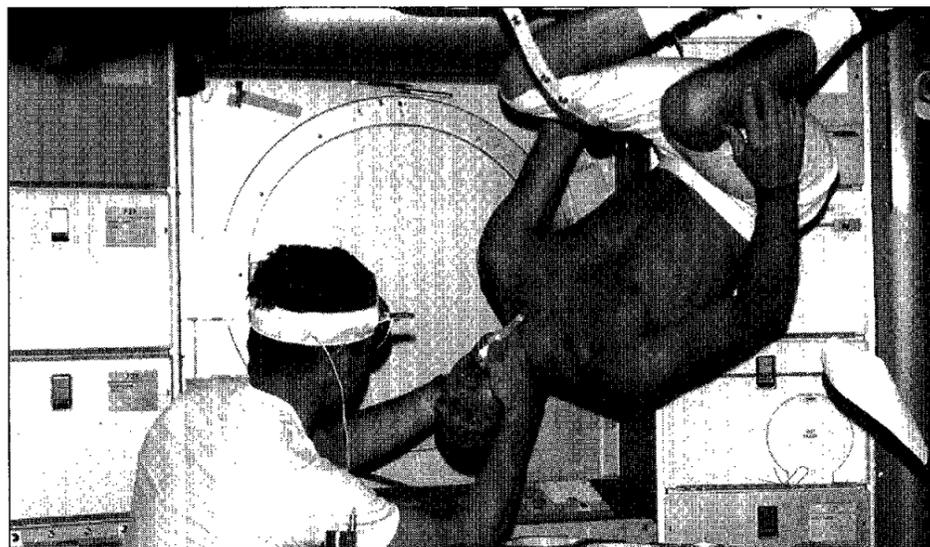
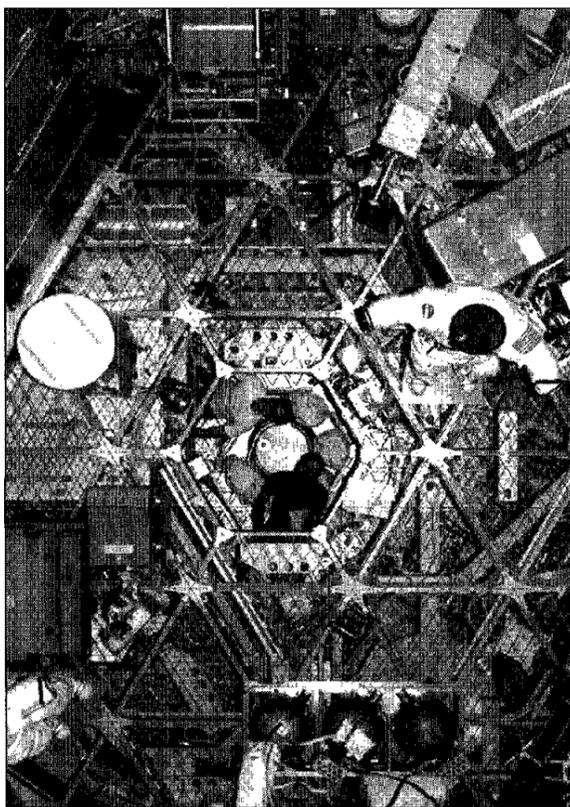
Ivory wedding gown w/pearls, sequins, v-neck, chapel length train, sz 6-8, veil, petticoat, \$400. x36696 or 332-9102.

Medical type lounge chair used for dialysis treatment, \$400. E. Rubenstein, x34807 or 532-2211.

Oriental rug, dk red/blue, \$50. Lisa, 474-5609.



Top: Jack Lousma, Skylab 3 pilot, participates in the EVA during which he and Owen Garriott deployed the twin pole solar shield to help shade the Orbital Workshop. **Right:** As if caught in a steel spider web, Skylab 4 Astronauts Jerry Carr and Ed Gibson peer from their living quarters through the aluminum gridwork which served as decks between workshop levels. The grids provided crews with a steady surface to hold as they operated the lab's scientific instruments and a place to store space-suits and other equipment. **Below:** Joe Kerwin, Skylab 2 pilot and medical doctor, gives Commander Pete Conrad an oral checkup. Conrad seems to stand on his head with only a foot restraint holding him. **Bottom:** Owen Garriott, Skylab 3 science pilot, lies in the Lower Body Negative Pressure Device that collected information concerning cardiovascular adaptation during the 59-day flight.



Learning from Skylab

Creature comforts can play important role in fostering, maintaining productivity of astronauts, flight controllers over long haul

[Editor's note: This is the second of two stories celebrating the 20th anniversary of the May 14 launch of the Skylab orbital workshop.]

By Kelly Humphries

The most important lesson to be learned from the Skylab program of 20 years ago is "that man can do useful work" while in orbit for long periods, according to JSC Deputy Director Paul J. Weitz.

Weitz, who spent 28 days with Pete Conrad and Joe Kerwin as the first Skylab crew, said it is clear that there are changes in the way the body operates in weightlessness, but that there doesn't appear to be any wall that astronauts hit where they have to live out the rest of their days in orbit.

"There are not seeming to be any physical limits to the amount of time we can keep people in zero gravity," he said.

What is still in question, is how to protect crews on board long-duration spacecraft and their support personnel on the ground from being driven crazy by overly demanding schedules, weird shift work, sterile surroundings and limited communication with the outside world.

"I think it's tough to stay in orbit for six months, let alone a year," Weitz said. "Whether you agree with perceived needs or not, I think we need to make people's visits as pleasant and as 'unonerous' as we can."

Some of the lessons learned by Americans on Skylab and by Russians on the Mir space station are difficult to apply for programmatic and budget reasons, Weitz said. Nevertheless, they are important and eventually will be put into practice.

One example of an idea that has come full circle is that of private sleep compartments for astronauts.

"Out of Skylab came a strong recommendation, and that input was made somewhere along the line in shuttle program. But someone decided we didn't need or want them in the shuttle. We all know that finally we have gone nearly full circle and on two-shift operations, we fly sleep compartments.

"Now, we have gone down the same path on space station," he said. "I'm convinced that as our space station program matures we will once again go to where we provide sleep compartments for the people."

Alan Bean, who commanded Skylab 3, agreed. "You've got to have a place, and I think sleep quarters are a good one, where you can have some privacy," Bean said. "Day after day working with others is a big change. If you change that too much it adds a lot of stress."

"We each had a private place to do that was ours," said Skylab 4 Commander Jerry Carr. "We could stick up family pictures and when you went to bed you could lay there and listen to music or write a letter and it was your place. I think that's very important."

The flip side of that record, however, is the need for contact with family and friends on Earth.

"That's what keeps people from having real serious separation problems," said Carr, who took advantage of every opportunity to talk with his family through the secure link that was provided to crew members every third day. The communications people on the ground would establish the link, then switch off to allow the astronauts and their families to talk. Other than that link, the only non-business communication with Earth on Skylab was Christmas cards sent up on the 2 1/2-inch teletype machine.

The crew members usually would move into the Apollo command module that ferried crews to and from Skylab and lie in one of the couches.

"They tried not to give us any disturbing information, tried to keep it fairly lighthearted," Carr remembered. "I'm not sure you really have to do that. When a member of the family is on orbit and going to be there for a long time, you might as well clue them in on everything that's going on in the family, good and bad."

Bean said he believes television is a much better connecting medium, and that in addition to family contact crew members need normal, everyday communication and entertainment just like on Earth. He suggested uplinking a couple of each crew members favorite television programs every day, commercials and all.

"Everybody has these little things they like and in the long term you can do without them but its easier to make do with them. Face to face contact with family and friends would be good once a day or every other day," Bean said. "It has to do with a mind set for everybody. It's like working with someone here on Earth. If you can talk, be friends and have the same general goals you won't have a problem."

In addition, the crew commander and flight director should receive special training in leadership, communication and empathy, Bean said.

"You've got to pick leaders that can see both sides and they have to talk to people to make sure they're doing it. In NASA, the people who move up ladder are those who communicate and understand the other person's point of view better. It's something we must continually pay attention to as on Earth."

"The flight director must be sensitive enough and aware enough of situation to realize when calls from the ground are starting to saturate the crew," Carr added. "He's going to have to control the traffic. But I can see clearly that you're going to have a crew up there working an experiment and they're going to want to talk with their Principal Investigator and discuss what's going on. I can see the flight director having to regulate that to some degree to keep operational traffic moving well, too."

"As crews get bigger and cultures differ and we have both sexes up there, I think the behavioral considerations are going to be quite a bit more complex, and I think it is necessary that people have some kind of training and that leaders must be screened for their ability to deal with those kinds of things," Carr agreed.

Visits also are important, Weitz said, and he hopes that visits to the space station aren't more than a few months apart in general. The Russians make a big deal out of each of their visits, bringing up mail, fresh fruit and vegetables.

Food also is an important consideration, and while Weitz said he believes the food on the shuttle is about as good as can be expected considering the environment, Bean said food that is more interesting to eat is desirable.

"You need pizza, spicy spaghetti, a little Mexican food," Bean said. "You need some kinds of food like we have here and we're moving in that direction."

Dining together as a crew is important, too, Weitz said. On Skylab 2, Commander Pete Conrad insisted the crew eat all of its meals together, which reinforced togetherness for a trio that was frequently at opposite ends of the workshop all day.

"We talked about what we did that day because given the size and the breakdown of the responsibilities on Skylab each of us may have done things of which the other two were unaware," Weitz said. "We usually had the next day's activities off the teleprinter by the time the evening meal came around so we could talk about what we were going to do on the next day."

Hygiene also is an important consideration, one that still causes difficulties on shuttle missions.

"Zero gravity is fun when you want to play," Weitz said. "Zero gravity is a pain in the neck when it comes to hygiene. When you brush your teeth, you like to spit in the sink and have it go down the drain."

Effective bathroom facilities are very important to space flight, whether for long or short periods, the Skylab astronauts agreed.

Carr said the Skylab toilet functioned well, although it was not the hands-off operation that shuttle toilet designers are trying to perfect. The Skylab toilet used air to blow the waste material through holes in the seat. A bag with a filter on the end entrained all of the fecal material and then the crew member would have to reach in and seal the bag. It was clean, reliable and didn't smell, he said.

"I thought the Skylab shower was great and looked forward to them," Weitz said. "I took as many as we could, which was two or maybe three. It was the greatest, it really was."

There are other minor but important considerations such as ergonomics, colors, having a consistent up and down orientation, they those can vary according to each crew.

Carr and Weitz both said NASA must guard against the continual erosion of crew amenities that occur as the space station is redesigned.

"What we have to do is learn to strike that balance where people are busy and motivated and enjoying their work and you'll get all kinds of stuff done," Carr said.

The work environment on Earth also needs to be upgraded, said Frank Hughes, chief of JSC's Space Flight Training Division. If possible, they should look like a comfortable office with windows, trees outside and plants inside room, in addition to comfortable chairs and consoles at which to work.

Shift work also must be made more bearable, he said, and experts are looking at ways to help flight controllers shift their wake-sleep cycles through various means in the same way that flight crews now are adjusted to their on-orbit timelines. There also will be additional needs for help from employee assistance programs because abnormal work schedules tend to obliterate social life and tax family relationships.

"What is it that can make our people want to be here, that enriches their jobs despite the fact that we've got three shifts a day?" is the question now being asked. □

STS-55 sets 'foundation for future research'

(Continued from Page 1)

said Commander Steve Nagel, who acknowledge that the flight got off to a shaky start because of a couple of problems that could have cut it short.

"The way it was pulled off was by this group of great guys who are behind me—every one of them are just terrific—who pitched in and fixed things and made them work, and by a whole army of people on the ground here, also at KSC to get

us launched and over at GSOC, the control center in Germany, that pulled this thing together and made it into a mission that worked."

Nagel added a special tribute to Pilot Tom Akers, who was called upon to fix some of those initial troubles.

"If your car is ever broken, your washing machine, anything—if it's broken you call him. He can fix it and he loves doing it."

Akers said he considered the

crew an extension of the people working on the ground, adding that the German people should be proud of their payload specialists.

"Both in Germany and here in Houston we had support that just wouldn't quit. By being your eyes and hands in space we were able to complete this mission successfully and safely," he said.

Payload Commander Jerry Ross said STS-55 represented the importance of manned space flight

for the future in terms of science and international cooperation.

"We did some very important, some very novel, some very unique science research on this flight and I think that in the next year's time as the data we've brought home today will show, we've learned some very important things that will add to the knowledge base so that we can go on and help to develop new and more wonderful things for mankind to improve the living conditions

here on Earth," he said.

Mission specialist Bernard Harris concentrated on the scientific achievements of the flight and their importance for the future.

"It really was a jam-packed mission, full of over 80 investigations in physical and life sciences," Harris said. "And it is these sciences and these experiments that we worked on for this past 10 days that I think will help set the foundation for future research."

JSC Asian Pacific Americans plan to celebrate heritage

JSC will observe Asian Pacific American Heritage Month with a pair of workshops and a luncheon this Friday at the Gilruth Center.

The observance is sponsored by the JSC Asian Pacific American Program Council.

The observance begins at 8:30 a.m. with a workshop called "Asian Americans: A Perspective on Perceptions," which looks at how a conscious awareness of people's differences can be used to positively affect others' perceptions of themselves and help us function effectively amid diversity. Glenda Joe, president of Great Wall Enterprises, a consulting firm specializing in advertising, public relations, research and marketing, will lead the workshop.

Dr. Wendy Lee Gramm, who serves on the board of directors at the University of Iowa, George Mason University and Enron Corp., will be the keynote speaker at an 1:30 a.m. luncheon. Her topic will be "Expanding Our Horizon."

An afternoon workshop on personal development will focus on how to become more effective and successful in personal and professional relationships.

A cultural program featuring the song, dance and costumes of various ethnic groups will wrap up the observance at 3 p.m.

All JSC employees are encouraged to attend their work loads permit. There is no advance registration, and the workshops are free. The luncheon costs \$7; tickets are available through the Equal Opportunity Programs Office at x33761.



JSC workers Rich Aucoin, Trisha Lopez, Malinda Boehl and Danna Hoppens pull into JSC after riding to work on Tuesday's National Bike to Work Day. Their destination was Bldg. 8.

JSC Photo by Benny Benavides

Fair weather, fast pedaling

By Kelly Humphries

JSC employees took advantage of good weather to join many other Americans on National Bike to Work Day this past Tuesday.

A survey and reports from the guards at JSC entrances showed that more than 100 people rode their bicycles to work Tuesday, said Susan Schellhase, who promoted JSC participation in the event.

A similar count taken the week before turned up only 37 riders. Another count will be taken this Tuesday to see if the experience caused any continuing increase in

bicycle ridership at JSC.

"I was sore yesterday and I'm still sore today, but it's OK," said Schellhase, who biked all the way from Friendswood.

JSC participation was an outgrowth of research by the Center Operations Directorate's human resources team into ways to help support recent Clean Air Act Amendments.

The new rules put increased demands on employers to encourage their workers to carpool and use other pollution-reducing methods of transportation, Schellhase said.

Workers' offspring earn scholarships

The children of four JSC employees have earned JSC Exchange Scholarships for 1993, based on their overall scholastic achievements, the extent of their financial need and the breadth and substance of their school and community activities.

This year's winners, who bring the total scholarship recipients to 72, are Rhonda Jean Alexander, Hilary Michelle Grabe, Steve Nelson Martin Jr. and Rita Marie Weisskopf. Each will receive \$4,000—up to \$1,000 a year—for studies at any university.

Alexander, daughter of Sharon Jean Alexander of Engineering's EVA Branch, will graduate from Sam Rayburn High School in May and plans to be a pre-med major at Hardin-Simmons University in Abilene.

Grabe, daughter of Astronaut Ron Grabe, will graduate first in her class from Clear Lake High School, and plans to attend Princeton University and major in molecular biology.

Martin, son of Steve N. Martin of Engineering's Systems Test Branch, will graduate from Friendswood high school, and plans to attend Baylor University, majoring in biology/pre-med.

Weisskopf, daughter of George A. Weisskopf of Engineering's Systems Support Branch, will graduate from Clear Creek High School in May after completing her requirements a semester early. She already is in her first semester of biomedicine and pre-med studies at Texas A&M University.

This year's winners of the NASA College Scholarship Fund were from Lewis Research Center, Langley Research Center, Dryden Flight Research Facility, and NASA Headquarters.

Six earn JSC Fellowships

Six JSC workers will receive this year's JSC Fellowships, which provide them an opportunity to attend graduate school on a leave-with-pay basis for one year.

Jerry Borrer of the Mission Operations Directorate will pursue a doctorate in mechanical engineering at the University of Houston.

Patrick Fink of the Engineering Directorate will pursue a doctorate in electromagnetics at the University of Houston.

Eric Hurlbert of Engineering will work on a masters in mechanical engineering at Penn State University.

Sheryl Dunnette of the Center Operations Directorate will work on a masters in mathematics at the University of Houston-Clear Lake.

Jeff Kowing of Engineering will study for a masters in neural networks at Boston University.

Laura Bollweg of Mission Operations will pursue a masters in industrial engineering at the University of Houston.

Thrift Savings season opens

Open season for the Thrift Savings Plan begins this week and extends through July 31.

TSP briefings are scheduled for 9:30 a.m. June 8 in Bldg. 45, Rm. 128, and 9:30 a.m. July 20 in Bldg. 45, Rm. 119.

The effective date for changes depends on when the election form is received by the Employee Services Section, AH76, Bldg. 45, Rm. 140. For more information, call the Employee Services Section at x32681.

JSC workers earn center's top honor

(Continued from Page 1)

This year's recipients are:

Janice F. Adams, Clayton C. Anderson, Margarita Aranda, Lupita M. Armendariz, Bryan P. Austin, Ronald J. Bartosh, John E. Blaha, Arthur C. Bond Jr., Cathy J. Boyd, Christine M. Boykin, Richard J. Bozeman Jr., Hubert J. Brasseaux Jr., Michele A. Brekke, Radel L. Bunker, Stephanie M. Castro, William J. Clark Jr., Richard E. Coblentz, Linda M. Copley, Robert E. Coward, Jan M. Cox, Frank L. Culbertson Jr., Richard D. Delgado, Stanley R. Donahoe, Troy J. Estes, David J. Fitts and Richard W. Fox;

Gregory F. Galbreath, Roger A. Galpin, Rafael Garcia, Lynda L. Gavin, Charlene E. Gilbert, Linda M. Godwin, Ph.D.,

Montgomery B. Goforth, Sandra C. Gordon, Dana R. Hacker, Patrice M. Halliburton, Robert F. Hall, Robert L. Harvey, William D. Harwell, Michael K. Hendrix, Francis E. Hughes, George A. Jarrell, Elsie F. Johnson, Ronald Johnson, B. Kent Joosten, Charles R. Justiz, Ph.D., Dayon D. Kane, Sarah A.V. Kirby, Kevin A. Klein, Monica B. Kruest, Marvin L. LeBlanc, Robert A. Ligons Sr., Richard H. Malecki, Dianna F. Mancuso, Grace Martinez, Linda F. Massey, Joyce E. Matrazzo, Gary D. Meester, Richard J. Meyer, Andrew J. Mitchell, Alfred E. Morrey III, Deborah L. Musgrove, Melody A. Nation, Deborah J. Meubek, Hanh Nguyen-Xuan and Son D. Nguyen;

Frederick A. Ouellette, Ginger L. Pack,

Charley B. Parker, Laura G. Pepper, Chris D. Perner, Patrick S. Pilola, Alice J. Pursell, S. Blake Ratcliff, Thomas W. Rathjen, William F. Readdy, Kenneth S. Reightler, Keith A. Reilly, Patsy H. Ritterhouse, Anna K. Rogers, Michael N. Rouen, Joyce M. Rozewski, Richard L. Sauer, Regor L. Saulsberry, Raymond T. Silvestry, Paul E. Sollock, LeBarian Stokes, Emily R. Strickler, Jean K. Stuart, Andre J. Sylvester, J. Harold Taylor, Cheryl M. Thuot, John K. Trainor, Michelle T. Truly, James E. Van Laak, Charles E. Verostko, Richardo J. Villarreal, Suzan C. Voss, Julia R. Watkins, Paul J. Weitz, Brian D. Welch, Catherine C. Williams, Ronald Williams, Jerome D. Yencharis, Eugene F. Zetka.

Design competition aims to motivate students

(Continued from Page 1)

reviewers and work with students during the conference. Interested people should contact Barbara Rumbaugh of USRA at 244-2000.

"This is not a competition in the sense that there is a 'winning' project. The goals of this program are to positively motivate students about the space program and to get feedback about their projects and presentation skills from professionals. The program offers students the opportunity to work in teams rather than compete against each other for grades, and to see what it is like to design and develop a project in the real world of peer review, budgets, schedules and resource limitations," said Vicki Johnson, program manager for the Advanced Design Program.

Typically, students in their senior

year participate in the program by enrolling in an advanced engineering design class taught by a professor who serves as faculty adviser and by a graduate teaching assistant who is the team leader. The teaching assistant spends the previous summer at one of eight participating NASA centers or at an industry-sponsor site preparing project plans, gathering relevant project information, making contacts and gaining experience working with NASA and contractor engineers. Each design team, made up of between three to 50 students, is assigned a NASA or industry mentor who provides help with project selection, advice and resources.

John Connolly, a New Initiatives Office engineer, serves as mentor to the University of Wisconsin-Milwaukee architecture school design team

developing "Domus 1," a lunar habitat and laboratory concept.

"NASA gets some major benefits from the Advanced Design Program. First we motivate many bright college students to work on problems that are of immediate concern to NASA or are a part of our long-range plans. We get a lot of good ideas for a relatively small investment. Second, the program doesn't just focus on aerospace engineering departments, but diversifies into other areas. Schools that never thought they could be a part of the space program see a place for themselves within the NASA family," Connolly said.

A major goal of the program is to provide networking opportunities for faculty with aerospace professionals and the opportunity to keep up to date with NASA and industry needs.

Students, too, find the networking opportunities often help focus their career goals and several Advanced Design Program alumni now work for JSC and JSC contractors.

Nathan Moore, a crew compartment designer in the Flight Crew Support Division, participated as a University of Houston architecture student in the first NASA/USRA design program. His college team built a radio-controlled lunar transportation track vehicle. "The program helps you learn the rigor that goes into the design of any space vehicle. As a student, you want to go out on the deep end with your design, and the USRA program keeps reeling you in to reality. It really prepares you for the professional world," said Moore, who now advises the University of Puerto Rico team.

Space News Roundup

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Swap Shop ads are due two weeks before the desired date of publication. Send ads to Mail Code AP3, or drop them off in the box outside Bldg. 2, Rm. 147.

Editor Kelly Humphries
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